Maryland School Assessment

Science

2007 Public Release

Grade 8

Acknowledgements:

A Sea Wall Just Molecule High

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New 'Time Machine' From Ice

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Session **4**

Directions

Use the technical passage below to answer Numbers 49 through 51.

New 'Time Machine' from Ice

Thanks to air bubbles trapped in a long cylinder of ice from a glacier in Antarctica, scientists have jumped an extra 210,000 years back in time. This scientific "time machine" now tells us how much carbon dioxide and methane was in the air as far back as 650,000 years ago.

Carbon dioxide and methane are two important greenhouse gasses that trap heat and can contribute to global warming.

The full name of the ancient tube of ice is the "EPICA Dome C ice core." It contains hundreds of thousands of years of air samples within tiny bubbles trapped in the ice. The air bubbles form when snowflakes fall. Each bubble contains a record of how much carbon dioxide and methane was in that air at a specific time in the past.

Today's rising level of carbon dioxide in the atmosphere is already 27 percent higher than its highest recorded level during the last 650,000 years, said Science author Thomas Stocker of the Physics Institute of the University of Bern, in Bern, Switzerland.

Stocker explained that this research adds another piece of information showing that humans have changed the concentrations of some gasses in the air much faster than these gas levels have changed in the more distant past.

The scientists compared the new record of carbon dioxide and methane from 390,000 to 650,000 years ago to the history of Antarctic temperature for the same time period. This comparison confirms previous reports of a steady relationship between Antarctic climate and carbon dioxide and methane during the last four ice ages and the warm periods in between the ice ages. The new ice core research also extends this steady relationship back another 210,000 years (two ice ages and two warm periods).

Knowing how long the greenhouse gasses and Antarctic climate have been "going steady" may help scientists predict how the climate will change in the future, the scientists say.

Discovering the history of gasses in the air is also useful for trying to answer all sorts of other questions, like, when did humans start changing the levels of gasses in Earth's atmosphere? And, how long might our current warm period last?

49 **How do humans contribute most to an increase in greenhouse gases in the atmosphere?**

- ○ **A** Public transportation is used in larger cities.
- ○ **B** Trees are planted when forests are harvested.
- ○ **C** Carbon dioxide is expelled when people breathe.
- ○ **D** Fossil fuels are burned as a source of energy.

50 **How would an increased carbon dioxide level, caused by humans, most likely affect Earth?**

- ○ **A** There would be more incoming sunlight.
- ○ **B** There would be more oxygen in the atmosphere.
- ○ **C** There would be a loss of many current environments.
- ○ **D** There would be a decrease in the number of earthquakes.

51 **How would an increase in greenhouse gases most likely affect coastal areas?**

- ○ **A** Precipitation would decrease.
- ○ **B** The sea level would increase.
- ○ **C** Salt content of the ocean would increase.
- ○ **D** The number of hurricanes would decrease.

52 **Roses produced asexually from cuttings are genetically identical to the parent. Roses grown from sexually produced seeds may look different from either parent.**

Which statement is best supported by this information?

- ○ **A** Sexually produced plants are a new species.
- ○ **B** Sexual reproduction produces more variation in plants.
- ○ **C** Asexually produced plants are larger than sexually produced plants.
- ○ **D** Asexual reproduction helps plants adapt to different environments.

53 **Scientists conduct investigations to answer questions.**

Before making a valid conclusion, scientists must

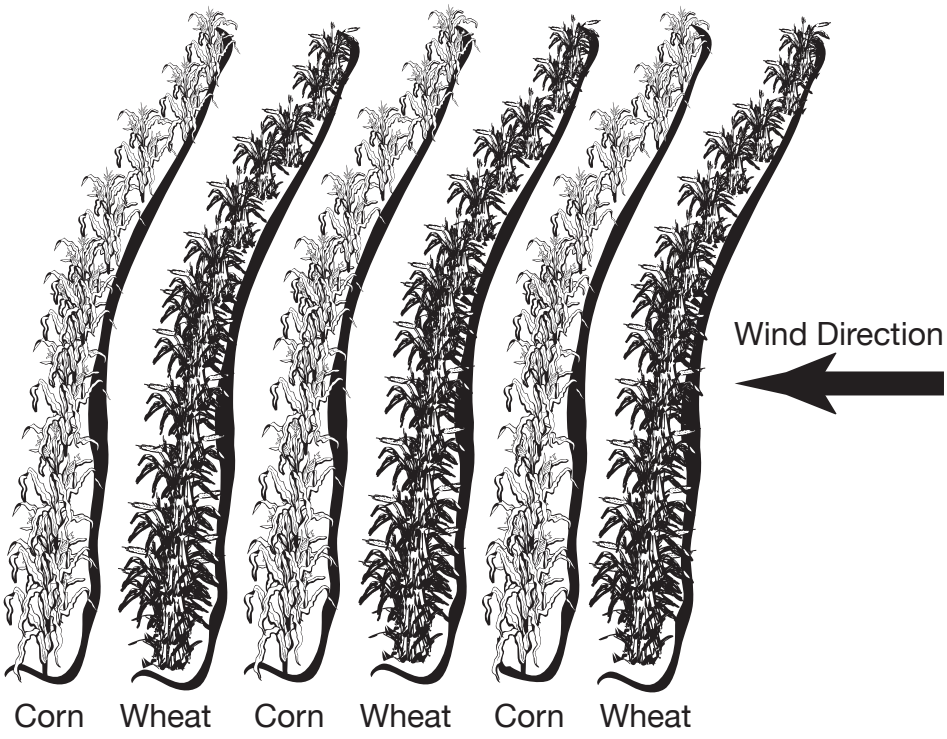
- ○ **A** collect relevant evidence
- ○ **B** tell people about the data
- ○ **C** publish results from the investigation
- ○ **D** discuss the investigation with other scientists

54 **When Chemical X is added to a certain liquid, the chemical breaks into Substances Y and Z. It is not possible to break Substances Y and Z into simpler particles.**

Which statement is best supported by this evidence?

- ○ **A** Chemical X is an element.
- ○ **B** Chemical X is soluble in water.
- ○ **C** Substances Y and Z are elements.
- ○ **D** Substances Y and Z are compounds.

55 **Strip cropping is a method of farming that plants two types of crops at the same time. The crops are planted in alternating sections across the slope of a field or at a right angle to the prevailing winds.**



Why do farmers <u>most likely</u> use strip cropping?

- ○ **A** to provide shelter for animals
- ○ **B** to protect the soil from erosion
- ○ **C** to protect the crops from weeds
- ○ **D** to provide different types of food

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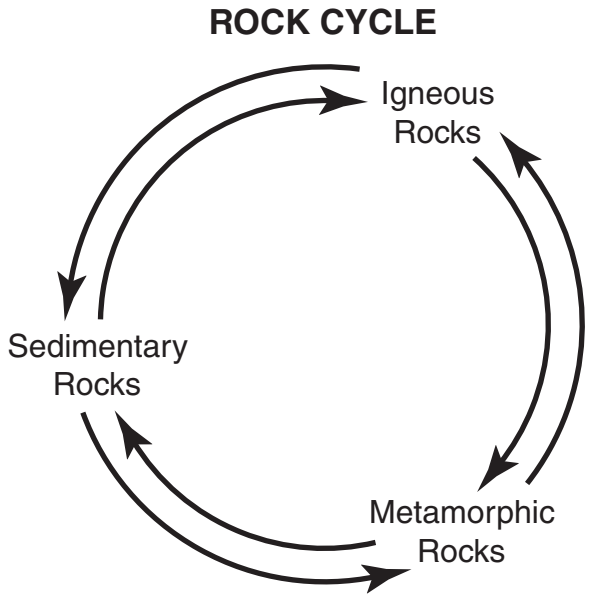
Directions

Use the information below to answer Numbers 56 through 58.

The rock cycle is a process that alters sedimentary, metamorphic, and igneous rocks. The diagram below shows the rock cycle.



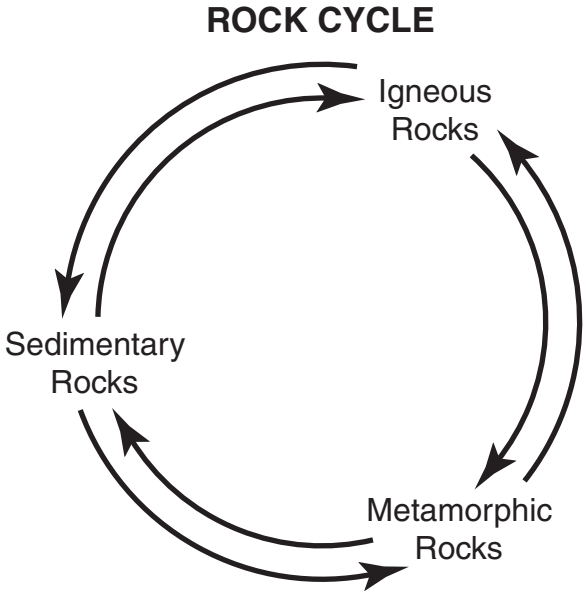
56 **Which process forms igneous rock?**

- **A** weathering of rock
- **B** cooling of liquid magma
- **C** heat and pressure changing solid rock
- **D** compaction and cementation of loose material

57 **Which type of rock contains the best fossil record?**

- **A** igneous
- **B** magma
- **C** metamorphic
- **D** sedimentary

58 **Igneous, metamorphic, and sedimentary rock are all part of the rock cycle.**

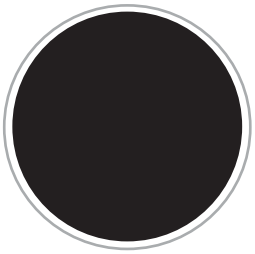


Explain how metamorphic rocks are part of the rock cycle. In your explanation, be sure to include

- **the features that make each rock type different**
- **the processes that result in the formation of each rock type**

Write your answer in the space provided.

59 **A new moon, as viewed from Earth, is diagrammed below.**



New Moon

Which statement <u>best</u> describes how a new moon occurs?

- ○ **A** Earth receives no sunlight.
- ○ **B** The moon receives no sunlight.
- ○ **C** Earth is between the moon and the sun.
- ○ **D** The moon is between Earth and the sun.

60 **A puppy has traits from its mother and its father.**

Which of these structures provides genetic information from the father to the puppy?

- ○ **A** a muscle cell
- ○ **B** a nerve cell
- ○ **C** a blood cell
- ○ **D** a sperm cell

61 **A teacher asks her students the following question: How does the air pressure inside a soccer ball affect the distance the soccer ball travels after the ball is kicked?**

Which statement below is the best hypothesis for this investigation?

- ○ **A** If a soccer ball is large, then the soccer ball will travel a farther distance than a small soccer ball.
- ○ **B** If a soccer ball has a high internal air pressure, then the ball will travel a farther distance than a soccer ball with less internal air pressure.
- ○ **C** If a soccer ball travels a distance of 15 meters, then the ball is traveling faster than a soccer ball that travels a distance of 20 meters.
- ○ **D** If a soccer ball has 0.5 atmospheres of internal pressure, then the ball will travel slower than a ball with 0.8 atmospheres of internal pressure.

Directions

Use the information below to answer Numbers 62 through 64.

During an investigation, students were given chemical data for several common household products, as shown in the data table below. Students were to determine if a substance was an acid or base by using litmus paper. Litmus paper turns red in an acid and turns blue in a base.

Substance	Color of Solution	Melting Point (°C)	Boiling Point (°C)	Soluble in Water	Odor	Litmus Paper Test
Carpet cleaner	Clear	0	100	Yes	Weak	Blue
Vinegar	Clear	−2	118	Yes	Strong	Red
Oven cleaner	Clear	−1	93	Yes	Weak	Blue
Bleach	Clear, light yellow	0	100	Yes	Strong	Blue

62 **Which physical property best classifies vinegar in a separate group of substances from oven cleaner?**

- ○ **A** boiling point
- ○ **B** melting point
- ○ **C** color of solution
- ○ **D** solubility in water

63 **Which conclusion is supported by the data from the investigation?**

- **A** Many cleaning supplies are soluble in water.
- **B** Cleaning solutions with a weak odor are acids.
- **C** Water is the main ingredient in many cleaning supplies.
- **D** A substance changes from a gas to a liquid as the temperature of the substance increases.

64 **Which statement describes the motion of the molecules within the carpet cleaner when enough heat energy is added to boil the carpet cleaner?**

- **A** The molecules stop moving.
- **B** The molecules move more slowly.
- **C** The molecules move more quickly.
- **D** The molecules begin moving at a constant rate.